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AUTHOR Harmer, William R.; Williams, Fern
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ABSTRACT

A comparison of the Wide Range Achievement Test (WRAT) and the Peabody Individual Achievement Test (PIAT) indicates that the two should be used interchangeably only with caution and understanding of the differences. While there is a moderate to high correlation between the test scores, nevertheless, the two have distinctly different strengths and weaknesses. The WRAT tends to be more accurate for older subjects (grades four through twelve) while the PIAT tends to be more accurate for younger subjects (kindergarten and primary grades). The differences in test content, testing procedures, test format, and method of scoring may account for the differences in grade equivalent scores on the two, especially on the math subtests. (TJ)

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The Wide Range Achievement Test and the Peabody Individual Achievement Test: A Comparative Study

William R. Harmer and Fern Williams
The University of Texas at Austin

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A Comparison of the WRAT and the PIAT

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The Wide Range Achievement Test (WRAT) is widely used as an individually administered screening test for spelling, arithmetic computation, and word recognition. Originally standardized in 1936, it was renormed in 1946 and again in 1976. In 1970, the Peabody Individual Achievement Test (PIAT) was published as a screening measure of spelling, mathematics, word recognition, reading comprehension, and general information. It, too, is widely used. Diagnosticians using the two measures find very little information available to help them compare the WRAT with the PIAT.

The PIAT manual describes a study using 46 educable mentally retarded adolescents achieving at third grade level. Results indicate moderate to high correlations between the math, reading and spelling subtests of the WRAT and PIAT as follows: Word Recognition, r = .95; Math, r = .58; Spelling, r = .85 (Sitlington, 1970).

A review of the literature located one other study which compared the WRAT with the PIAT (Dean, 1976). A group of Mexican American (N = 31) and a group of Anglo (N = 31) children were given both tests (Dean, 1976). Results of this study indicate moderately high correlations on the subtests for both groups: Mexican American, r = .88 for reading, r = .71 for arithmetic and r = .78 for spelling; Anglo, r = .84 for reading, r = .64 for arithmetic, and r = .77 for spelling.

The purpose of this paper is to provide a statistical and descriptive comparison of the WRAT and the PIAT based on the scores obtained by a sample given both tests. Our discussion will focus on those test factors which may account for score differences on the math subtests and will aid the clinician in determining which of the two is more appropriate in a given situation.

METHOD

The WRAT and three corresponding subtests of the PIAT were administered to clients at ~~a University affiliated~~ the Univ. of Texas Learning Disabilities Center during the last five years. Testing is done by trained clinicians under controlled, supervised conditions at the center. Clients at the center are referred by parents or schools for suspected learning problems. Sixty-six children took the word recognition subtests, 62 took the spelling subtests and 66 took the math subtests.

RESULTS

Moderate to strong positive correlations between subtests were obtained (Reading, $r = .87$, $p = .05$; Spelling, $r = .73$, $p = .05$; Math, $r = .64$, $p = .05$). However, looking at the data by subtest and grade placement we find significnat differences in math scores at grade four and beyond. Grade equivalent scores for the spelling and reading subtests indicate a much greater similarity at all grade levels (Table 1).

At grades one, two and three there is no preference for the PIAT math scores to be higher or lower than the WRAT. However, individual cases at grade four and beyond show differences as great as six years.

Some specific examples of students referred to the Center illustrate this difference: 1) a fifth grade boy (IQ 125) earned a WRAT score of 6.7 and a PIAT score of 12.9. He worked 27 examples on the WRAT. Three of his four mistakes were simple computational errors such as 4-0 equals 0 and the failure to regroup correctly in addition and multiplication items. On the PIAT he reached a grade equivalent of 7.6 before he made any errors.

TABLE 1
Mean Grade Equivalent Scores for WRAT
and PIAT Subtests

GRADE	1	2	3	4	5	6	7	8	9*	10	11
ARITHMETIC											
WRAT	2.3	2.8	2.9	3.7	5.0	3.9	4.2	6.0		6.7	6.6
PIAT	2.2	2.8	3.0	5.0	7.4	6.0	5.7	7.2		9.2	11.0
N	8	12	11	4	6	9	5	6		2	3
SPELLING											
WRAT	1.9	2.5	2.9	2.9	4.5	3.6	4.0	4.7		5.6	5.0
PIAT	2.0	2.5	3.0	2.9	3.9	3.4	4.8	5.0		4.3	5.6
N	7	11	11	4	6	9	3	6		2	3
READING											
WRAT	2.3	3.0	3.4	2.9	5.5	4.2	4.6	5.5		6.7	7.0
PIAT	2.0	3.0	3.1	3.1	5.3	3.9	4.4	5.1		6.8	6.2
N	8	12	11	4	6	9	5	6		2	3

*no joint case

2) A sixth grade boy (IQ 85) earned a grade equivalent of 3.4 on the WRAT and 7.0 on the PIAT. Because he correctly computed only four of ten items attempted on the WRAT the examiner administered the oral test which includes very simple items such as counting dots and identifying digits. The boy's PIAT score, however, was approximately at his grade placement.

3) A seventh grade boy (IQ 109) earned a score of 2.9 on the WRAT and 5.7 on the PIAT. He, too, was administered the oral test on the WRAT because he earned a raw score of three on the main body of the test. His PIAT score was almost three years above the WRAT score.

DISCUSSION

Examination of test protocols and observations of test behaviors suggest possible reasons for the noted differences between WRAT and PIAT math scores. The WRAT is a pencil and paper test of computation and includes simple and complex addition, subtraction, multiplication, division, fractions, including decimal fractions, percent and algebra. Only one item is provided for each type of problem.

In contrast to the WRAT, authors of the PIAT rejected emphasis on arithmetic fundamentals that stress computational skills because "the tasks would be mechanical and boring" (Dunn & Markwardt, 1970). Instead, emphasis was placed upon problems that enabled the application of mathematical concepts. In developing the PIAT, the authors compiled a chart of concepts being taught at various grade levels, beginning with identifying, matching and naming numerals, then moving upward through division, multiplication, fractions, decimals, percentages and finally concluding with measurement, geometry, algebra and trigonometry. An attempt was made to devise problems in each category which would allow a subject to apply his mathematical knowledge to their solution. Dunn and Markwardt (1970) state that after field testing, item analysis and modification, any initial balance in measuring systematically all of the mathematical processes was lost. Items were not retained in the battery because they were measuring a particular concept, but rather, because of their difficulty level and their qualities as good screening

test items. The content of the PIAT is restricted to problems that can be solved mentally. Thus, complex and time consuming problems are excluded.

The WRAT subtests are divided into two levels. Level I is designed for use with children between the ages of 5 years to 11 years, 11 months. Level II is intended for persons from 12 years to adulthood (Jastak & Jastak, 1976). Few test items are appropriate for the average kindergarten child, but the ceiling for high school students is ample.

In contrast, the PIAT was constructed so as to be most sensitive at the lower levels and to decrease gradually in sensitivity with advancing grade levels. This was done in the belief that the PIAT is likely to be used most often with persons whose achievement is at the lower level of the test range. Sensitivity at the kindergarten level was elected because of the need for an achievement test at this level (Dunn & Markwardt, 1970). Although the authors state that "an adequate top was built in so as to test bright high school students," there are a smaller number of items at upper levels and the top level of difficulty of items is "just slightly above the 12th grade" (Dunn & Markwardt, 1970).

In addition to content differences, procedural differences may also account for some of the wide variation in grade equivalent scores at the higher grade levels. The WRAT is a timed test; the child attempts to work as many problems as possible in ten minutes. The PIAT is an untimed test. In some instances this might enable a child to try a few more items on the PIAT than on the WRAT. Our observations, however, have been that ten minutes is ample time for a student to complete all the problems he knows how to do on the WRAT where basic

arithmetic facts and knowledge of operations are paramount. So, the time element probably does not account for score differences between the two tests except in a relatively few instances.

The difference in administration, test format and method of scoring may partially account for some score differences between the two subtests. The PIAT test materials are colorful and appealing and call for continuous interaction between examiner and testee. The child may indicate his response by pointing or calling out the quadrant number of his choice. The examiner may ask the child to clarify his responses, encourage him to work carefully and praise his efforts. Therefore, some students may be more motivated to perform well on the PIAT than on the WRAT.

The multiple choice format of the PIAT lends itself to guessing and sometimes enables a child to earn an unrealistically high score. The examiner is instructed to encourage the testee to guess. Some children are better at this than others. On many items it seems relatively easy to narrow the options from four to two where the student then has a 50/50 chance of selecting the correct response. This element of guessing together with the method of establishing a ceiling on the PIAT could enable a student to earn a few extra raw score points which translate into as much as a year's difference in the earned grade equivalent. This is particularly true beyond the primary level where the standard error of measurement is 5 raw score points. A raw score of 47 translates to a grade equivalent of 6.0 while three more raw points places the student at seventh grade.

For example, a boy in the third month of the fourth grade earned a score on the WRAT of 3.9 while on the PIAT he scored 7.0. On the

PIAT the basal is established by five consecutive correct responses and the ceiling is established by five incorrect answers in seven consecutive items. This boy begin making errors as early as item 35. After item 40, he earned just enough points to keep going. He was able to try items to 65 before he reached a ceiling. His teacher evaluated his math achievement as below average, so for this child, an early fourth grader, the earned PIAT score of seventh grade was probably unrealistically high. In another instance, a student beginning grade eleven earned a grade equivalent on the WRAT of 6.9 and on the PIAT of 12.9. Another boy at early sixth grade earned a grade equivalent of 6.1 on the WRAT and 9.9 on the PIAT. The protocols of these three students look very similar.

The following examples illustrate how scoring procedures can result in wrong responses counted as correct on the PIAT. Because the school indicated poor achievement in math, the examiner began testing an eleventh grade student at item 40 and established a basal. A second basal was established between items 57 and 61. Thus, the first basal was considered "false" and all incorrect items below 57 were counted as correct. The result was that the student earned a score of 10.8 rather than 9.3. The same student had a WRAT score of 5.3. In a similar instance, a sixth grade student earned a PIAT score of 8.2 as the result of this scoring procedure while his WRAT score was only 4.4.

SUMMARY

The differences in test content, testing procedures, test format, and method of scoring may individually or in combination account for the differences in grade equivalent scores between the

WRAT and PIAT math subtests. In spite of a moderately high positive correlation between the two, the results of this study indicate they cannot be considered as providing the same information about students' arithmetic abilities.

In summary, the WRAT and PIAT math subtests should not be used interchangeably without consideration for the basic differences between the two tests. Caution is particularly indicated when using the PIAT subtest at grades 4-12 because obtained scores may grossly misrepresent a child's achievement level. It is doubtful that the PIAT provides sufficient ceiling for twelfth grade students. At kindergarten and primary levels the examiner may select the PIAT subtest rather than the WRAT on the following bases: 1) larger number of appropriate items for kindergarten children, 2) greater appeal of the test format to ~~kindergarten children~~, and 3) increased opportunities for interaction between examiner and testee.

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